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## WHAT PROPORTION OF MY INCOME OUGHT I TO SAVE?

*To the Editors of the Assurance Magazine.*

GENTLEMEN,—Let I represent my income, made up of earnings and of interest upon my realized property, or capital. Let C be such capital; and  $p$  the rate of premium for insurance upon my life.

Now I should wish that, in the event of my death, my family should have the means of living in the same degree of comfort which they may enjoy during my life. Accordingly, I desire to know how much of my income I ought to set aside for insurance of an amount sufficient to render the *remaining* income a perpetuity. It is true that, when I die, my own personal expenses for food, clothing, and so forth, will cease; but, on the other hand, my family may then be larger, or more expensive, than at present; so that I think it right to provide for the continuance of an income of the same amount after my death as that which I can properly spend during life. Let such income be represented by S.

I find that my capital is invested so as to yield 4 per cent. interest; and I suppose the same rate may be fairly assumed for the future. So the sum I must insure will be the excess of 25 years' purchase of S over C.

The annual premium will be  $p(25 S - C)$ ; and  $S + p(25 S - C)$  will be I, my total income; whence it appears that  $S = \frac{I + pC}{1 + 25p}$ .

Suppose my earnings to be £500 a year, that I have £1000 invested capital, and that the rate of insurance on my life is 3 per cent., I, (my total income) is = 540; C is = 1000; and

$$\frac{I + pC}{1 + 25p} = \frac{540 + 30}{1 + .75} = \frac{570}{1.75} = 325.714.$$

I ought therefore to spend . . .	£325 14 3	per annum.
And to invest in premiums or otherwise . . .	£214 5 9	"

The above amount of premium will insure . . .	£7142 17 2
Which added to my present capital of . . .	1000 0 0
Makes . . .	£8142 17 2

and this sum, improved at 4 per cent. interest, will yield £325. 14s. 3d. per annum, as required.

Now although I think it right thus to set aside a sufficient amount, according to the ordinary chances of life, to insure the sum above mentioned, I am not sure that I shall actually effect so large a policy. I shall rather follow the Reversionary Interest Societies, who charge the premium in their calculations, but do not usually insure to the full amount of their advances. I can probably employ a part of my money to advantage in mortgages, or other investments, and shall therefore only insure such a sum as would protect my family from a serious reverse of fortune in case of my premature death. Still I shall be doing more than most people, for they seem to think they have done great things if they secure to their relatives one or two years' income. Surely policies ought to be not only a hundred times as numerous, but ten times as large.

I have made the calculation on the assumption that my earnings will continue as long as I live. But if I wish to retire from business at any specified age, I have only to take  $p$  = the premium for an endowment assurance payable at that age, or at death, if earlier. And if the means should ever be afforded to us of assuring safely against ailments, which disqualify for work but do not kill, I may arm myself at all points by taking the premium for such an assurance combined with the endowment and the simple reversion at death.

Two other points suggest themselves:—

1. At how much ought I to be rated for income-tax?—I should say, clearly at £325. 14s. 3d. per annum, the amount of my spending income.

2. How much ought I to devote to charitable and religious objects?—Probably a tithe of my spending income, or £32. 11s. 5d. per annum.

I am, Gentlemen,

Yours truly,

Dec. 19, 1851.

JOHN ADAMS HIGHAM.

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ERRATA IN PAGE 93 OF THIS VOLUME.

*To the Editors of the Assurance Magazine.*

GENTLEMEN,—I shall feel greatly obliged to you if you will kindly correct the following errata in my paper on “Contingencies,” which you did me the honour to insert in the October Number of your valuable Magazine.

I am, Gentlemen,

*London Assurance,*

Nov. 26, 1851.

Yours very faithfully,

PETER HARDY.

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Page 93, for the formulae which follow the words “and if the perpendicular columns be summed,” &c. &c., read

$$\left( A_n \bar{I}^1 - \frac{a_n - a_{n+1}}{2a_n r} \right) \frac{a_n}{ar^n};$$

the third column will be found equal to

$$-\left( \frac{\bar{I}^1_{A_n B} + 1}{2r} - \frac{a_n}{2a_n r} \right) \frac{a_n}{ar^n};$$

the fourth to

$$\left( \frac{\bar{I}^1_{A_n B}}{2} \right) \frac{a_n}{ar^n};$$

the fifth to

$$-\left( \frac{\bar{I}^1_{A_n B_1} + 1}{2r} \cdot \frac{b_1}{b} \right) \frac{a_n}{ar^n};$$

the sixth to

$$\left( \frac{\bar{I}^1_{A_{n+1} B} + 1}{2r} \cdot \frac{a_{n+1}}{a_n} - \frac{a_{n+1}}{a_n} \right) \frac{a_n}{ar^n}.$$